

## 中国竹生真菌新记录

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**摘要:** 鉴于对我国香港和云南省的竹生真菌的调查和研究 (1998-1999) 有下列诸属和所隶 12 种系我国新记录。东孢菌属, 节链孢属, 链束霉属及其所属共计 12 种。

**关键词:** 竹类; 真菌; 丝孢纲; 分类

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## New Records of *Ellisembia*, *Penzigomyces*, *Sporidesmium* and *Repetophragma* Species on Bamboo from China

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**Abstract:** During a diversity survey of bambusicolous fungi in Hong Kong and Yunnan, many hyphomycete specimens were collected in 1998-1999. Among them, 11 new records including two new combinations of *Ellisembia*, *Penzigomyces* and *Sporidesmium* species from Hong Kong and Yunnan are reported here. They are *Ellisembia bambusicola* (new combination), *E. coronata*, *E. pseudoseptata* (new combination), *Penzigomyces uapocae*, *Repetophragma subulata*, *Sporidesmium ehrenbergii*, *S. eucalypti*, *S. eupatoriicola*, *S. fragilissimum*, *S. penzigi* and *S. verrucisporium*.

**Key words:** Bamboo; Fungi; Hyphomycetes; Taxonomy

*Sporidesmium* was established by Link based on the type species of *S. atrum* Link (Ellis, 1971). Subramanian (1992) reassessed *Sporidesmium* and proposed the diagnostic features of *Sporidesmium ehrenbergii* (the type material of the type species *A. atrum* is absent). *Sporidesmium* has simple, septate conidiophores and the solitary, gangliar, thick-walled, and euseptate conidia. The conidiophore may proliferate percurrently to produce further solitary conidia. Based on euseptate or pseudoseptate nature of the conidium and distinctive features of conidiophore proliferation, Subramanian (1992) divided the heterogenous *Sporidesmium* into 7 genera, namely *Ellisembia* Subraman., *Penzigomyces* Subraman., *Polydesmus* Mount., *Repetophragma* Subraman., *Sporidesmiella* Kirk, *Sporidesmium* Link, *Sporidesmiella* Kirk and *Starkehughesia* Subraman.

A fungal diversity study on bamboo in Hong Kong and Yunnan were carried out during 1998 and 1999. Many hyphomycete specimens were collected from dead or senescent bamboo culms in these two

areas. Among hyphomycete species found from this study, 12 new records of *Ellisembia*, *Penzigomyces* and *Sporidesmium* from Hong Kong and Yunnan were found and reported here. They are *Ellisembia bambusicola* (new combination), *E. coronata*, *E. pseudoseptata* (new combination), *Penzigomyces flagellata*, *P. uapacae*, *Repetophragma subulata*, *Sporidesmium ehrengergii*, *S. eucalypti*, *S. eupatoriicola*, *S. fragilissimum*, *S. penzigii* and *S. verrucisporium*.

## Materials and Methods

Bamboo dead culms (about 25 cm long each) were collected from Hong Kong and Yunnan during the rainy season in 1998 and 1999. They were returned to the laboratory at Centre for Research in Fungal Diversity, Department of Ecology and Biodiversity, The University of Hong Kong and incubated in polythene bags lined with moistened tissue. Material was periodically examined for the presence of fungal fruiting bodies. Single spore isolations were attempted, but the ascospores failed to germinate. All microscopic measurements were taken from specimens mounted in water.

## Taxonomy

1. *Ellisembia* Subram. (束孢菌属), Proceedings of Indian Natural Science Academy B38: 4: 179 (1992)

Subramanian (1992) established *Ellisembia* to accommodate species previously assigned the genus *Sporidesmium*. The genus comprises 12 species having proliferated, or percurrent and regular conidiophores and pseudoseptate conidia (Subramanian, 1992). Descriptions and transfers of some species of *Sporidesmium* on leaves of *Freyinetia* and *Padanus* were provided by McKenzie (1995).

1.1 *Ellisembia bambusicola* (M. B. Ellis) D. Q. Zhou and K. D. Hyde (竹生束孢菌), comb. nov.

Basionym: *Sporidesmium bambusicola* M. B. Ellis, Mycological Papers, 70: 43 (1965)

Known hosts: On dead culm of *Bambusa* (Ellis, 1976), *Arundinaria hindii* and *Indocalamus sinicus* (this study).

Known distribution: Ghana, Sierra Leone (Ellis, 1976) and Hong Kong (this study).

Material examined: Hong Kong, Hong Kong Island, Victoria Peak, on the dead culm of *Arundinaria hindii*, 17 Sept. 1998, Dequn Zhou (HKU (M) 9199); *ibid.*, New Territories, Sai Kung, on the dead culm of *Indocalamus sinicus*, 27 June 1998, Dequn Zhou (HKU (M) 9056); *ibid.* (HKU (M) 9057).

Remarks: This species is transferred from *Sporidesmium bambusicola* based on the delimitation of *Ellisembia* (Subramanian, 1992). *E. bambusicola* is closed to *E. bambusae* (= *Sporidesmium bambusae*) but they are different in *E. bambusae* having wider conidia with mid or dark brown basal cell (Ellis, 1976). The conidium of the collections match *Sporidesmium bambusicola*, although they are slightly shorter ( $56-96 \times 12-14 \mu\text{m}$  vs.  $65-105 \times 11-14 \mu\text{m}$ ) (Ellis, 1976).

1.2 *Ellisembia coronata* (Fuckel) Subraman. (冠状束孢菌), Proceedings of Indian Natural Science Academy, B58: 183 (1992)

Known hosts: On the conidiophores of *Helminthosporium velutinum* and on dead wood, bark of *Acer*, *Fagus*, *Philadelphus*, *Sambucus*, *Sarothamnus* (Ellis, 1976) and *Sinobambusa tootsik* (this study).

Known distribution: Europe including Great Britain (Ellis, 1976) and Hong Kong (this study).

Material examined: Hong Kong, New Territories, Tai Lam Country Park, on the dead culm of *Sinobambusa tootsik*, 8 Sept. 1998, Dequn Zhou (HKU (M) 9121); ibid., Hong Kong Island, Long Fu Shan Country Park, on the dead culm of *Arundinaria hindsii*, 7 June 1998, Dequn Zhou (HKU (M) 8341).

Remarks: *Ellisembia coronata* was typified by Subramanian, which was basionymized from *Sporidesmium coronatum* Fuckel (Subramanian, 1992). As a species in the group which have pseudoseptate conidia, *Ellisembia coronata* is closed to *E. leonense* M. B. Ellis, but they are different in *E. leonense* (= *Sporidesmium leonense*) having much smaller conidia (Ellis, 1976). Based on the delimitation of *Ellisembia* given by Subramanian (1992), *Sporidesmium leonense* should be transferred into *Ellisembia*. The specimens match *Ellisembia coronata* (Ellis, 1976) but the conidia is slightly wider ( $42-66 \times 10-14 \mu\text{m}$  vs.  $35-70 \times 9-12 \mu\text{m}$ ) (Ellis, 1976). This species are both super-parasitic on *Helminthosporium velutinum* and saprophytic on broadleaves hosts (Ellis, 1976). This is the first record on senescent bamboo culms as a saprophyte.

1. 3 *Ellisembia pseudoseptata* (M. B. Ellis) D. Q. Zhou and K. D. Hyde (假隔束孢菌), comb. nov.

Basionym: *Sporidesmium pseudoseptatum* M. B. Ellis, Mycological Papers 103: 44-45 (1965)

Known hosts: On dead twigs (Ellis, 1976) and on senescent culm of *Phyllostachys heteroclata* (this study).

Known distribution: Sierra Leone (Ellis, 1976) and Kunming, China (this study).

Material examined: China, Yunnan, Kunming, West Hill, on senescent culm of *Phyllostachys heteroclata*, 16 Sept. 1999, Dequn Zhou (HKU (M) 9361).

Remarks: Based on the generic concept of *Ellisembia* (Subramanian, 1992), this species should be transferred into *Ellisembia*, as the conidia are pseudoseptate (Ellis, 1976). This species resembles *E. coronata*. In the latter species, however, conidia are much wider and pale brown and the conidia in *E. pseudoseptata* are pale straw colored (Ellis, 1976). This specimen is identified as *Ellisembia pseudoseptatum* based on morphological affinities and dimension, but conidia are slightly longer at maximum length ( $52-64 \times 6-8 \mu\text{m}$  vs.  $36-56 \times 7-8 \mu\text{m}$ ) (Ellis, 1976).

2. *Penzigomyces* Subraman. (节链孢属), Proceedings of Indian Natural Science Academy, B58: 186 (1992)

Subramanian (1992) reassessed *Sporidesmium* Link and established *Penzigomyces* Subram. with type species *P. nodipes* (Penz. & Sacc.) Subraman. for fungi having simple conidiophores which are septate, brown with regular, successive, doliform, lageniform or nodose percurrent proliferations; conidia are gangliar, solitary, acrogenous, euseptate, brown, dry, when he re-assessed *Sporidesmium*, a hetero-genus (Subramanian, 1992). Six new species of *Penzigomyces* were added (Subramanian,

1997).

**2.1 *Penzigomyces flagellata*** (S. Hughes) Subram (鞭状节链孢). Proceedings of Indian Natural Scientific Academy, B58: 186 (1992)

Known host: On the dead branches of *Citrus* (Ellis, 1976) and *Ripogonum scandens* (Hughes, 1977).

Known distribution: Ghana (Ellis, 1976), New Zealand (Hughes, 1977) and Hong Kong (this study).

Material examined: Hong Kong, New Territories, Sai Kung, Tu Kwa Pin, on dead culms of *Indocalamus sinicus* (Hance) Nakai, 30 July 1998, Dequn Zhou (HKU (M) 9058).

Remarks: *Sporedesmium flagellatum* (S. Hughes) M. B. Ellis was accommodated in *Penzigomyces* from *Sporedesmium* (Subramanian, 1992). This specimen agrees with *Penzigomyces flagellata*, but the conidia are slightly shorter and wider than those of *Penzigomyces flagellata* ( $52.5 - 97.5 \times 11 - 12.5 \mu\text{m}$  vs.  $55 - 105 \times 10 - 11 \mu\text{m}$ ) (Ellis, 1976), which occurs on dead branches of *Citrus* in Ghana (Ellis, 1976) and *Ripogonum scandens* in New Zealand (Hughes, 1977).

**2.2 *Penzigomyces uapacae*** (M. B. Ellis) Subraman. (竹生节链孢), Proceeding of Indian Natural Sciences Academy, B58: 187 (1992)

Known hosts: overgrowing colonies of *Echidnodes* on leaves of seedling trees (Ellis, 1976) and on the dead culm of *Neosinocalamus affinis*, *Phyllostachys bambusoides* and *P. pubescens* (this study).

Known distribution: Great Britain (Ellis, 1976) and Yunnan (this study).

Material examined: Yunnan, Kunming, Anning, Qiu Muyuan, on the senescent culm of *Phyllostachys pubescens*, 5 Oct. 1998, Dequn Zhou (HKU (M) 9159); *ibid.*, Lunan, on the dead culm of *Phyllostachys bambusoides*, 30 Sept. 1998, Dequn Zhou (HKU (M) 9181); *ibid.*, Chengong, on the dead culm of *Neosinocalamus affinis*, 4 Oct. 1998, Dequn Zhou (HKU (M) 9185), *ibid.*, on the dead culm of *Phyllostachys bambusoides*, 4 Oct. 1998, Dequn Zhou (HKU (M) 9186).

Remarks: *Penzigomyces uapacae* resembles *Repetophragma aburiense* (M. B. Ellis) Subraman., but in the latter species, conidia are 2-4 septate and truncate at the base (Ellis, 1976; Subramanian, 1992). The conidium size of this collection falls within the size range except they are slightly wider than those of *P. uapacae* ( $42 - 62 \times 6 - 8 \mu\text{m}$  vs.  $50 - 80 \times 6 - 7 \mu\text{m}$ ) (Ellis, 1976). Originally the species was found on leaves of seedling trees and overgrowing colonies of *Echidnodes* (Ellis, 1976), but our collections are completely saprophytic on senescent bamboo culms.

**3. *Repetophragma*** Subraman. (环梗霉属), Proceedings of Indian Natural Science Academy, B58: 185 (1992)

*Repetophragma* was introduced by Subramanian (1992) based on the type species of *R. biseptata* (M. B. Ellis) Subraman. for the fungi characterized with acrogenous, solitary, euseptate, truncate at base, dry conidia; conidiophores brown, simple, septate; and conidiogenous cell integrated, apical anelate. There are a species in the genus, of which most had been transferred from *Sporedesmium* (Subramanian, 1992).

**3.1 *Repetophragma subulata*** (Cooke & M. B. Ellis) Subraman. (钻形环梗霉), Proceedings of

Indian Natural Science Academy, B58: 185 (1992)

Known hosts: On bark of *Castanea* sp. (Cash, 1952), *Liquidambar* (Ellis, 1976), on the dead culm of *Phyllostachys glauca* and *P. basihirsuta* (this study).

Known distribution: USA (Ellis, 1976) and Hong Kong (this study).

Material examined: Hong Kong, New Territories, Tai Po Kau Natural Reserve, on the dead culm of *Phyllostachys glauca*, 6 June 1998, Dequn Zhou (HKU (M) 8361), *ibid.*, Hong Kong Island, No. 1 Pokfulam Reservoir, on the dead culm of *P. basihirsuta*, 30 June 1998, Dequn Zhou (HKU (M) 9010).

Remarks: *Repetophragma subulata* resembles *Sporidesmium jasminicola*, however, the latter has much shorter conidia and conidiophores are annellate (Subramanian, 1992). The collections match *Repetophragma subulata* well except that the conidiophores are slightly narrower ( $97.5 - 155 \times 13 - 18 \mu\text{m}$  vs.  $90 - 160 \times 15 - 19 \mu\text{m}$ ) (Ellis, 1976).

#### 4. *Sporidesmium* Link (链束霉属), *Magazin Ges. Naturf. Freunde Berlin* 3: 41 (1809)

*Sporidesmium* was established by Link based on the type species of *S. atrum* Link (Ellis, 1971). Subramanian (1992) reassessed *Sporidesmium* and proposed the diagnostic features of *Sporidesmium ehrenbergii* (the type material of the type species *A. atrum* is absent). *Sporidesmium* has simple, septate conidiophores and the solitary, gangliar, thick-walled, and euseptate conidia. The conidiophore may proliferate percurrently to produce further solitary conidia. *Sporidesmium* species seem to have host preference on dicotyledonous plants (Ellis, 1971, 1976) except that *S. bambusae* M. B. Ellis and *S. bambusicola* M. B. Ellis occur on dead culm of *Bambusa* sp. and *Oxytenanthera* (Ellis, 1976) as well as *Sporidesmium minigelatinosum* Matsush. on *Phyllostachys edulis* and *P. makinoi* (Matsushima, 1980).

##### 4.1 *Sporidesmium ehrenbergii* M. B. Ellis (尹氏链束霉), *Mycological Papers*, 70: 63 (1958)

Known hosts: On dead branches of *Tilia* (Ellis, 1976) and on the dead culm of *Neosinocalamus affinis* (this study).

Known distribution: Europe, India, USA (Ellis, 1976) and Yunnan (this study).

Material examined: China, Yunnan, (Kunming, Anning, Yu Longwan), on the dead culm of *Neosinocalamus affinis*, 9 Aug. 1998, Dequn Zhou (HKU (M) 9096).

Remarks: This species resembles *Sporidesmium penzigii* M. B. Ellis but it is different in the latter species having much longer conidiophores and shorter conidia (Ellis, 1976). HKU (M) 9096 fits description of *Sporidesmium penzigii* well, however, the conidia are slightly narrower ( $46 - 98 \times 8 - 10 \mu\text{m}$  vs.  $60 - 86 \times 10 - 12 \mu\text{m}$ ) (Ellis, 1971).

##### 4.2 *Sporidesmium eucalypti* M. B. Ellis & D. Shaw (桉树链束霉), *Mycological Papers* 72: 74 (1959)

Known hosts: On leaves of *Eucalyptus* (Ellis, 1976) and on the dead culm of *Arundinaria hindsii* (this study).

Known distribution: New Guinea (Ellis, 1976) and Hong Kong (this study).

Material examined: Hong Kong, New Territories, Tai Po Kau Natural Reserve, on the dead culm of

*Arundinaria hindsii*, 6 June 1998, Dequn Zhou (HKU (M) 8347).

Remarks: This species is similar to *Sporidesmium cladii* M. B. Ellis. However, they are different in *S. cladii* having much larger conidiophores and on leaves of *Cladium* as well as temperate distribution, whereas in *S. eucalypti* having subtropical distribution and from *Eucalyptus* leaves (Ellis, 1976). The conidia size of this collection is slightly wider ( $120 \times 4-7 \mu\text{m}$  vs.  $150-350 \times 6-8.5 \mu\text{m}$ ) (Ellis, 1976).

**4.3 *Sporidesmium eupatoriicola*** M. B. Ellis (泽菌链束霉), Mycological Papers 70: 67 (1958)

Known hosts: On dead stems of *Eupatorium*, *Eilipendula*, branches of *Betula* and *Ochthocosmus* (Ellis, 1971) and senescent culm of *Bambusa textilis* (this study).

Known distribution: Europe, Sierra Leone (Ellis, 1971) and Hong Kong (this study).

Material examined: Hong Kong, New Territories, Tai Po Kau Natural Reserve, on senescent culm of *Bambusa textilis*, 6 June 1998, Dequn Zhou (HKU (M) 9048).

Remarks: *Sporidesmium eupatoriicola* and *S. pedunculatum* (Peck) M. B. Ellis are quite similar. However, in *S. pedunculatum*, conidia are much wider ( $11-13 \times \text{m}$  vs.  $8-11 \mu\text{m}$ ) (Ellis, 1976). The collection is similar to *Sporidesmium eupatoriicola* morphologically except that the conidia are slightly wider ( $110-137 \times 12-13 \mu\text{m}$  vs.  $60-195 \times 8-11 \mu\text{m}$ ) (Ellis, 1971).

**4.4 *Sporidesmium fragilissimum*** (Berk. & Curt.) M. B. Ellis (脆硬链束霉), Mycological Papers, 70: 55 (1958)

Known hosts: On the dead stems of *Smilax* and wood (Ellis, 1976), *Dendrocalamus bambusoides* and *Neosinocalanus affinis* (this study).

Known distribution: U. S. A (Ellis, 1976) and Yunnan, China (this study).

Material examined: China, Yunnan, Kunming, International Horticultural Exposition, Bamboo Garden, on the dead culm of *Dendrocalamus bambusoides*, 28 Sept. 1998, Dequn Zhou (HKU (M) 9170); ibid., Lunan, on the dead culm of *Neosinocalanus affinis*, 30 Sept. 1998, Dequn Zhou (HKU (M) 9191);

Remarks: *Sporidesmium fragilissimum* is closed to *Penzigomyces flagellatum* but different in the latter species conidia are wider and conidiophores are lageniform and nodose-like (Ellis, 1976; Subramanian, 1992). The collections are similar to *S. fragilissimum*, especially in the size of conidia ( $52-72 \times 6-8 \mu\text{m}$  vs.  $32-92 \times 8-9 \mu\text{m}$ ) (Ellis, 1976).

**4.5 *Sporidesmium penzigii*** M. B. Ellis (彭氏链束霉), Mycological Papers, 82: 45. (1958)

Known hosts: On rotten wood (Ellis, 1976) and *Sinobambusa tootsik* (this study).

Known distribution: Java (Ellis, 1971) and Hong Kong (this study).

Material examined: Hong Kong, New Territories, Tai Lam Country Park, on the dead culm of *Sinobambusa tootsik*, 8 Sept. 1998, Dequn Zhou (HKU (M) 9120).

Remarks: This species resembles *S. ehrenbergii* but differs in the latter having shorter conidiophores and longer conidia (Ellis, 1976). The collection fits *S. penzigii* very well. The specimen was collected from a mixture wood, which is composed of bamboo and other dicotyledonous plants, by a small lake.

**4.6 *Sporidesmium verrucisporium* M. B. Ellis (疣孢链束霉), Mycological Papers, 70: 57 (1958)**

Culture characters: Colonies ca 6.5 cm. diam. after two months on PDA, flat, fluffy, brown. Mycelium superficial, sparse, septate and branched.

Known hosts: On the dead twigs of *Uvaria* (Ellis, 1976) and *Arundinaria hindsii* (this study).

Known distribution: Sierra Leone (Ellis, 1976) and Hong Kong (this study).

Material examined: Hong Kong, Hong Kong Island, Lung Fu Shan Country Park, on the dead culm of *Arundinaria hindsii*, in a mixture wood, 30 July, 1998, Dequn Zhou (HKU (M) 9078).

Remarks: In this species conidia are verrucose, which is similar to *Pezizomyces flagellata* but they are different in the latter species having lageniform and nodose-like conidiophores and smooth upper cells of the conidia (Ellis, 1976). This collection was identified as *Sporidesmium verrucisporium* based on the description and illustrations by Ellis (1976).

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[References]

- Cash E K, 1952. A record of the fungi named by J. B. Ellis (Part 1) [R]. U. S. D. A. Special Publication, 2: 1-165
- Ellis M B, 1971. Dematiaceous Hyphomycetes [R]. CAB International, Wallingford, UK, 608
- Ellis M B, 1976. More Dematiaceous Hyphomycetes [R]. CAB International, 507
- Hughes S J, 1977. New Zealand Fungi 25. miscellaneous species [J]. *New Zealand Journal of Botany*, 16: 311-370
- Matsushima T, 1980. Saprophytic microfungi from Taiwan [J]. *Matsushima Mycol Mem*, 1: 1-82
- Mckenzie E H C, 1995. Dematiaceous Hyphomycetes on Podanaceae. 5. *Sporidesmium sensulato* [J]. *Mycotaxon*, 56: 9-29
- Subramanian C V, 1992. A Reassessment of *Sporidesmium* (Hyphomycetes) and some related taxa [C]. *Proceedings of Indian Natural Science Academy*, B 58: 179-190.
- Subramanian C V, 1997. Hyphomycetes from South East Asia - Novelities from Singapore and Malaysia [J]. *Kaenka*, 22/23: 52-76